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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/863,376	05/24/2001	Geon Seog Son	P66694US0	9525

7590 08/08/2005

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EXAMINER

KERNS, KEVIN P

ART UNIT	PAPER NUMBER
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1725

DATE MAILED: 08/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/863,376

**Applicant(s)**

SON, GEON SEOG

**Examiner**

Kevin P. Kerns

**Art Unit**

1725

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2005 and 27 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-11 and 13-15 is/are rejected.
- 7) ☒ Claim(s) 3 and 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 May 2001 and 06 May 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on five applications filed in the Republic of Korea between May 20, 1999 and October 14, 1999. It is noted, however, that applicant has not filed certified copies of the Korean applications as required by 35 U.S.C. 119(b).

### ***Specification***

2. The disclosure is objected to because of the following informalities: throughout the specification, there remain numerous spelling and grammatical errors, most of which are likely due to translation. Corrections and/or clarifications are required for these remaining errors that occur throughout the specification.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, 4-11, and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hall et al. (WO 99/12638) in view of Janata et al. (US 5,778,664).

Hall et al. disclose a plasma reactor portion of an exhaust system for an internal combustion engine for treatment of gaseous emissions, in which the plasma reactor 1 has a reactor chamber 2 that includes two metallic grids in the form of electrodes (3,4), (406,414), or mesh electrodes (501,502) at inlet and outlet portions having active (photocatalytic) material within reactor bed (5,33) disposed between electrodes/grids (3,4), (406,414), or (501,502); a honeycomb carrier section 22 containing a plurality of carrier cells, in which the structure of the honeycomb carrier includes wires, wire wools, weaves, bobbins, bonded or pressed sheets, discs, and rolls; and a plasma generating means (plasma protic source) in the form of AC power supply 6, which is capable of charging particulate material in the reactor bed 5 to a potential sufficient to excite the exhaust gases to a plasma state, with the embodiment of Figure 8 including a two stage reactor that includes plasma activated pellet bed reactor 802 and second plasma enhanced pellet bed reactor 807, both of which have catalyst beds 805 with electrodes (abstract; page 9, line 20 through page 12, line 29; page 14, line 2 through page 15, line 31; page 17, lines 9-28; page 19, line 5 through page 23, line 18; page 26, line 35 through page 28, line 29; and Figures 1-4 and 8). Although not specifically disclosed by Hall et al., one of ordinary skill in the art would have recognized that a photocatalyst layer would readily be varied in terms of volume and/or number, not just the inner surface adjacent the outer portions of the honeycomb carrier, for the purpose of obtaining more uniform distribution of photocatalyst on an increased surface area, improving the reduction of noxious components of exhaust gases. Hall et al. do not

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disclose the use of a photocatalyst layer in the form of a coating within the honeycomb carrier, rather than a granular, pellet-type layer.

However, Janata et al. disclose an apparatus for photocatalytic destruction of internal combustion engine emissions, in which the apparatus includes a photocatalyst layer coating 23, such that the photocatalyst layer coating is advantageous for obtaining improved catalysts for oxidation of gaseous hydrocarbons and carbon monoxide, and for the reduction of nitrogen oxides in exhaust systems (abstract; column 1, lines 12-20 and 66-67; column 2, lines 1-67; column 3, lines 1-67; column 4, lines 1-37 and 66-67; column 5, line 1 through column 7, line 36; and Figures 1, 2, and 2a).

It would have been obvious to one of ordinary skill in the art at the time the applicant's invention was made to modify the granular, pellet type layer of the plasma reactor portion of an exhaust system for an internal combustion engine for treatment of gaseous emissions, as disclosed/suggested by Hall et al., by instead using a photocatalyst layer in the form of a coating within the honeycomb carrier, as taught by Janata et al., in order to obtain improved catalysts for oxidation of gaseous hydrocarbons and carbon monoxide, and for the reduction of nitrogen oxides in exhaust systems (Janata et al.; column 1, lines 14-20).

#### ***Allowable Subject Matter***

5. Claims 3 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to teach or suggest the following elements: 1) a honeycomb carrier having a plurality of carrier cells, in which a 3-way catalyst layer is coated on a wall surface of each of the carrier cells, with a photocatalyst layer coated on the 3-way catalyst layer (dependent claim 3); and 2) plasma generating means in the form of electrodes, with each electrode being in the form of a honeycomb, such that each cell of the electrode includes a 3-way catalyst layer coated on a surface thereof (dependent claim 12).

### ***Response to Arguments***

7. The examiner acknowledges the applicant's amendment and replacement drawing sheets received by the USPTO on May 6, 2005 and June 27, 2005. The replacement drawing sheets overcome prior objections to the drawings. The amendments overcome prior objections to the abstract and claims. However, many errors remain in the specification (see paragraph 2). Also, no foreign priority documents have been submitted with the application (see paragraph 1). The applicant has cancelled non-elected claims 16-27. Claims 1-15 remain under consideration in the application.

8. Applicant's arguments with respect to claims 1, 2, 4-11, and 13-15 have been considered but are moot in view of the new ground(s) of rejection.

**Conclusion**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kevin P. Kerns whose telephone number is (571) 272-1178. The examiner can normally be reached on Monday-Friday from 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (571) 272-1171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kevin P. Kerns *Kevin Kerns 8/4/05*  
Primary Examiner  
Art Unit 1725

KPK  
kpk  
August 4, 2005